

Reconsideration of this application is respectfully requested in light of the following remarks.

Even when combined, the cited references fail to teach or suggest a method for forming a single-crystal silicon layer on a transparent substrate, comprising the step of **subjecting the laminated silicon wafer and the amorphous silicon layer to infrared light to cause chemical bonding of the single-crystal silicon layer and the amorphous silicon layer and inducing a hydro-cracking reaction in-situ** thereby separating the silicon wafer and the transparent substrate at the hydrogen ion layer, and leaving the single-crystal silicon layer on the transparent substrate, as recited in claim 1.

MPEP 2142 reads in part:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In connection with the third criteria, MPEP 2143.03 goes on to state:

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 1 recites using an infrared light to both **bond** the single-crystal silicon layer and the amorphous silicon layer and **induce** a hydro-cracking reaction in-situ to separate the silicon wafer and transparent substrate at the hydrogen ion layer. This feature is critical for the

invention since infrared light can pass through the non-infrared absorbent glass substrate and amorphous silicon layer to cause chemical bonding of the infrared-absorbing single-crystal silicon and the amorphous silicon layer, and when the heating reaches a certain temperature, a hydro-cracking reaction can be induced at the hydrogen ion layer. As such, the bonding and separating process can be completed in a single heating process by infrared light. See page 5, lines 22-30, and page 6, lines 1-6 of the application.

Applicant respectfully submits that none of the cited references teach or suggest using the infrared light in a bonding and separating process in-situ as recited in claim 1. Namely, as stated by the Examiner, Henley et al, Bachrach et al and Murphy et al fail to teach or suggest the use of infrared light in bonding processes and in controlled cleaving processes. The Examiner therefore relies on Usenko et al to teach the use of infrared light to cause splitting of the wafer.

However, Usenko et al also fail to teach or suggest a step of performing ***bonding and separating in-situ*** by infrared light. To the contrary, Usenko et al teach a process for manufacturing a silicon-on-insulator wafer from a silicon wafer assembly in which an amount of energy from an energy source is applied to the assembly to separate the assembly along a fragile layer. The third embodiment referred to by the Examiner in the rejection describes using an infrared energy source to cause ***separation*** of the layers. See column 5, line 52 to column 6, line 41 of Usenko et al. There is no teaching or suggestion of the use of an infrared energy source to cause chemical ***bonding*** of the single-crystal silicon layer and the amorphous silicon layer and inducing a hydro-cracking reaction in-situ, as recited in claim 1.

Furthermore, the advantage achieved by the invention, i.e., performing bonding and separating in-situ in a single heating process by infrared light, is unappreciated and unexpected from the teachings of the cited references.

It is therefore Applicant's belief that even when taken in combination, the prior art references relied upon by the Examiner do not teach or suggest all the limitations of claim 1. For at least this reason, a *prima facie* case of obviousness cannot be established in connection with this claim. Furthermore, as it is Applicant's belief that a *prima facie* case of obviousness is not established for claim 1, the Examiner's arguments in regard to the dependent claims are

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considered moot and are not addressed here. Allowance of claims 1-3 and 5-7 is respectfully requested.

Conclusion

For the reasons described above, the Applicant believes that the application is now in condition for allowance and respectfully requests so.

Respectfully submitted,



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